CLAIMS

What is claimed is:

1. A gas valve for controlling the flow of gas to a burner, the gas valve comprising:

an actuator that controls the flow of gas through the valve;

a stepper motor that operates the actuator;

a first temperature sensor that senses temperature of gas entering the valve;

a second temperature sensor that senses temperature of gas leaving the valve; and

a controller that controls the stepper motor in response to the sensed temperatures.

2. The gas valve of claim 1 wherein the actuator comprises a linear actuator.

3. The gas valve of claim 1 wherein at least one of the temperature sensors comprises a thermistor.

4. The gas valve of claim 1 wherein the first temperature sensor is prevented from self-heating.

5. The gas valve of claim 1 wherein the second temperature sensor is allowed to self-heat.

6. The gas valve of claim 1 wherein the first temperature sensor comprises a lead in an inlet of the gas valve and the second temperature sensor comprises a lead in an outlet of the gas valve.

7. The gas valve of claim 1 wherein the controller uses a heat loss by the second temperature sensor to determine the gas flow rate.

8. The gas valve of claim 1 wherein the actuator is between an inlet and an outlet of the valve.

9. The gas valve of claim 1 further comprising an inlet chamber, an outlet chamber, and a poppet on the actuator operable between the chambers to control the flow of gas through the valve.

10. A gas valve for controlling the flow of gas to a burner, the gas valve comprising:

an actuator that controls the flow of gas through the valve;

a first temperature sensor that senses temperature of gas entering the valve;

a second temperature sensor that senses temperature of gas leaving the valve;

a controller that determines a gas flow rate based on the sensed temperatures; and

a stepper motor that drives the actuator in response to the determined gas flow rate.

11. The gas valve of claim 10 wherein the actuator comprises a linear actuator.

12. The gas valve of claim 10 wherein at least one of the temperature sensors comprises a thermistor.

13. The gas valve of claim 10 wherein the first temperature sensor is prevented from self-heating.

14. The gas valve of claim 10 wherein the second temperature sensor is allowed to self-heat.

15. The gas valve of claim 10 wherein the first temperature sensor comprises a lead in an inlet of the gas valve and the second temperature sensor comprises a lead in an outlet of the gas valve.

16. The gas valve of claim 10 wherein the controller uses a heat loss by the second temperature sensor to determine the gas flow rate.

17. The gas valve of claim 10 wherein the actuator is between an inlet and an outlet of the valve.

18. The gas valve of claim 10 further comprising an inlet chamber, an outlet chamber, and a poppet on the actuator operable between the chambers to control the flow of gas through the valve.

19. A gas combustion system comprising a gas burner and a gas valve that controls the flow of gas to the burner and having a first temperature sensor in an inlet of the valve and a second temperature sensor in an outlet of the valve, the temperature sensors providing information from which is obtained a gas flow rate through an inlet chamber and an outlet chamber of the valve;

the valve further comprising a stepper motor and a poppet operable between the chambers via the stepper motor for adjusting the gas flow rate.

20. The gas combustion system of claim 19 further comprising a controller that determines an adjustment to the gas flow rate using input from the temperature sensors.

21. The gas combustion system of claim 19 wherein the stepper motor is mounted on an outer surface of the gas valve, and wherein a shaft of the motor extends through the surface into the valve, the poppet operable via the shaft.

22. A method of controlling the flow of gas through a gas valve having an inlet connected with an inlet chamber, an outlet chamber fluidly connectable to the inlet chamber, and an outlet connected with the outlet chamber, the method comprising:

determining temperatures of the inlet and outlet;

determining a flow rate adjustment based on the temperatures; and

translating rotational movement by a stepper motor shaft into linear movement by a poppet between the chambers to apply the determined flow rate adjustment.

23. The method of claim 22 wherein determining temperatures comprises receiving inputs from a first temperature sensor having a lead in the inlet and from a second temperature sensor having a lead in the outlet.

24. The method of claim 23 wherein determining a flow rate adjustment comprises:

allowing the second temperature sensor to self-heat; and

determining a heat loss by the self-heated temperature sensor.

25. The method of claim 22 further comprising supplying constant and unequal currents to first and second temperature sensors.

26. An improved gas appliance having a burner and a gas valve through which the flow of gas to the burner is controlled via a linear actuator, the improvement comprising:

a pair of thermistors configured to indicate a gas flow rate through the valve; and

a stepper motor that drives the actuator in response to the indicated gas flow rate.

27. The improved gas appliance of claim 26 wherein the thermistors comprise a first thermistor configured to sense temperature in an inlet of the valve, and a second thermistor configured to sense temperature in an outlet of the valve.

28. The improved gas appliance of claim 26, wherein the improvement further comprises the actuator having a poppet driven by the stepper motor to fluidly connect inlet and outlet chambers of the valve.

29. A gas valve comprising:

an inlet;

an outlet;

a valve seat;

a valve member operable relative to the valve seat to open and close the valve to control the flow therethrough;

a stepper motor for operating the valve member; and

a control system comprising an inlet temperature sensor, an outlet temperature sensor, and a control for controlling the stepper motor to operate the valve member in response to the temperatures sensed by the inlet temperature sensor and outlet temperature sensor.